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threat in days after the Sept. 11 attacks, insisting that nuclear containment buildings are "robust" and capable of withstanding

In newly released documents, however, the Nuclear Regulatory Commission concedes that even an accidental airplane crash was not factored into the designs of 96 percent of U.S. nuclear plants. At those plants where the threat was considered, design changes were aimed at smaller airplanes traveling at slower speeds.

"When the plants were designed, large aircrafts that are presently used were not in use," NRC spokeswoman Sue Gagner said.

The agency also acknowledged that critical systems that provide cooling, electricity and storage of spent fuel are mostly in nonhardened buildings that could not withstand an aircraft or missile attack.

The revelations were included in a report made available by U.S. Rep. Edward J. Markey, D-Mass., based on responses to his queries from NRC Chairman Richard A. Meserve. Markey, a frequent critic of the NRC, said the agency's acknowledgment shows additional steps must be taken to improve nuclear plant safety.

The "NRC has admitted that even an aircraft impact at the auxiliary electrical or cooling facilities could trigger a core meltdown at a nuclear reactor, and yet the NRC refuses to upgrade security, refuses to install anti-aircraft weaponry, refuses to ensure that security at decommissioned reactors is maintained, and refuses to ensure that foreign nationals employed at the reactors undergo security background checks," he said.

Yesterday, the agency maintained that reactors remain difficult targets although it has not evaluated the effects of a plane crash.

"Even though they were not designed to withstand aircraft crashes, they are extremely rugged structures," Gagner said.

While many nuclear plants, including those in Pennsylvania, have had additional protection from National Guard troops and state police since Sept. 11, the NRC has rejected the idea of deploying anti-aircraft weapons.

When most plants were built in the 1960s and 1970s, the NRC and plant owners never contemplated that a large airliner would intentionally be crashed into a nuclear plant. Consideration of an airplane crash was limited to accidents.

Fifty-five of the nation's 60 nuclear plants lie within 15 miles of public airports. Most are small airports, carrying fewer than 100,000 departing passengers a year, according to NRC and FAA data.

Nine operating plants, including TMI, are near airports that serve more than 100,000 passengers. Other airports near nuclear plants include international airports in Charlotte, N.C., and near Pittsburgh.

Three Mile Island in Londonderry Twp., three miles from Harrisburg International Airport, is the only nuclear power plant "constructed with special design features to protect vital areas from crash impact and fire effects," the new documents state.

However, those features -- reinforcement of outer walls, thickening of concrete sections, special fire protection and ventilation -- would likely be inadequate, according to the NRC.

TMI -- which was hit by the nation's worst nuclear accident 23 years ago today, on March 28, 1979 -- was designed to withstand the impact of 200,000 pounds at 230 mph. A Boeing 757 or 767 such as those used in the New York and Washington attacks on Sept. 11 weighs 272,500 to 450,000 pounds. The planes used in those attacks traveled at speeds of 350 mph to 537 mph when they struck.

TMI was not built to withstand the impact of a larger airplane because "the probability of an on-site crash was sufficiently low," the NRC stated.

Two other plants – the Limerick nuclear plant near Pottstown and Seabrook plant in Portsmouth, N.H., – incorporated more modest features to help them withstand the impact of an airplane weighing up to 12,500 pounds.

"With respect to the remaining sites, the probability of an aircraft impact was either estimated or judged by inspection to be sufficiently low such that the event need not be considered in the design basis," NRC documents state.

David Lochbaum, nuclear safety engineer for the Union of Concerned Scientists, said it would be difficult to retrofit existing plants, but new safety features should be incorporated in the next generation of plants.

"The plants are what they are," said Lochbaum. "It's too late to go back and install 6 more feet of concrete."

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